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EXAMINER

KENDALL, CHUCK O

ART UNIT	PAPER NUMBER
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2192

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06/05/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/686,418

Applicant(s)

CZERWONKA, JACEK A.

Examiner

Chuck O. Kendall

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03/05/07.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This is in response to amendment filed on March 5, 2007. Claims 1 - 23 are currently pending and have been considered below.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 - 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Briand et al. (NPL: A UML-Based Approach to System Testing) in view of MacPherson 6,088,664.

Claim 1.

Briand discloses, *in a computing environment, a method comprising:*

- *receiving an original model comprising a plurality of elements representing operations to test;* (Page 11, left column; "...testability: The degree to which a model (in our case, a UML diagram) has sufficient information to allow automatic generation of

test cases... ". The model is in the form of Unified Modeling Language (UML) diagram.

Page 11: Overview of the TOTEM System Test Methodology; "Use case diagram", "Use case descriptions", "Sequence or collaboration diagrams for each use case". The plurality of elements are in the form of use cases.)

- *producing a list of fixed element subsequence corresponding to at least two elements; and (Fig. 1 - A2, A5 and associated text, e.g., page 12: "3.1 Generating Use Case Sequences". A test sequence contains at least two use cases.)*

- *generating a suite of test cases from the list of subsequences, such that any valid subsequence appears at least once among the test cases in the suite. (Fig. 1, A7 and associated text, e.g., page 12; "...A7 and A8 are concerned with generating the test cases and code for oracles... ". The generated test cases cover all the sequences of the use cases.)*

Briand doesn't expressly disclose wherein each subsequence comprises a predetermined and fixed number of elements, the number being at least two and list comprising all subsequences such that each subsequence of elements of length equal to the fixed number is represented within the list and removing from the list of subsequences each subsequence having been designated as invalid.

However, Macpherson in an analogous art and similar configuration of testing including use of sequences and parameters (see abstract, "selects test parameters from an array of test parameters") discloses a cylinder number array i.e. (predetermined and fixed length sequence) and successive modification from repeated errors i.e. (removing subsequences being listed as invalid) (4:55 - 67 and 5:35 - 60). Therefore it would

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have been obvious to one of ordinary skill in the art at the time the invention was made to combine Briand and Machpherson because it would enable dynamically adapting the tests as suggested by MacPerhson (5:35 – 40).

Claim 2.

Briand discloses *the method of claim 1 further comprising:*

- *evaluating a constraint against the test cases to determine for each test case whether that test case matches the constraint.* (Fig. 2 and associate text, e.g., pages 12-13: "3.1.1 Representation of Use Case Sequential Dependencies"; "...the vertices are use cases and the edges are sequential dependencies between the use cases...".)

Claim 3.

Briand discloses *the method of claim 2, wherein the constraint matches a selected test case, and further comprising:*

- *splitting the test case into at least two test cases.*

(Figs. 4 and 5, page 16: "Directed graph corresponding to activity diagram" and "Tree derived from directed graph". At node D, use case activities are split into B, F, and E. The test cases corresponding to the split use case sequences are generated accordingly.)

Claim 4.

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Briand discloses *the method of claim 1 further comprising:*

- *evaluating a precondition against the test cases to determine for each test case whether that test case matches the precondition.* (Fig. 2 and associate text, e.g., pages 12 - 13: "3.1.1 Representation of Use Case Sequential Dependencies"; "...the vertices are use cases and the edges are sequential dependencies between the use cases...".)

Claim 5.

Briand discloses *the method of claim 2, wherein the precondition matches a selected test case, and further comprising:*

- *splitting the test case into at least two test cases.* (Figs. 4 and 5, page 16: "Directed graph corresponding to activity diagram" and "Tree derived from directed graph". At node D, use case activities are split into B, F, and E. The test cases corresponding to the split use case sequences are generated accordingly.)

Claim 6.

Briand discloses *the method of claim 1, wherein a plurality of preconditions is known, and further comprising:*

- *sorting the preconditions into an order,* and (Fig. 4 - "Directed graph" and associated text, e.g., page 16; "...a directed graph can be derived by transforming join and fork synchronizations into regular edges ...Those paths represent possible sequences of parameterized use cases that can be executed...". The preconditions are sorted in order of execution sequence.)

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- *evaluating each precondition against the test cases based on the order to determine for each test case whether that test case matches the precondition.* (Tables 1 and 2 - "use case sequences" - and associated text, e.g., pages 17 - 1 B. The test cases contain sequences of use cases according to the execution order prescribed in the preconditions.)

Claim 7.

Briand discloses *the method of claim 1, wherein generating a suite of test cases from the subsequences comprises:*

- *selecting a subsequence based on a selection algorithm, and* (Page 12: "Generating Use Case Sequences" and associated text; "...principles underlying the representation and generation of possible use case test sequences... ". Appendix H: "...algorithms for the production of complete use case sequences to be tested from the activity diagram describing use case sequential dependencies and test scale information ... ".)

- *adding the selected subsequence to a test case.*

(Page 14: "Generation of Use Case Sequences"; "...The combination of instantiated use case sequences ... ".)

Claim 8.

Briand discloses *the method of claim 7 further comprising:*

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- *marking the selected subsequence as covered.* (Pages 17 - 18: Generation of "interleaving" sequences. When use case sequences are generated by combining use cases, the combined uses cases are implicitly kept track as already been covered.)

Claim 9.

Briand discloses *the method of claim 8 further comprising:*

- *selecting another subsequence from a set of uncovered subsequences, and* (Page 14: "Generation of Use Case Sequences"; "...The combination of instantiated use case sequences ...".)

- *adding the other subsequence to the test case.* (Table 2: "interleaving instantiated sequences". Combinations of use cases are computed.)

Claim 10.

Briand discloses *the method of claim 8 wherein selecting a subsequence based on a selection algorithm comprises:*

- *determining which element starts a largest number of still uncovered subsequences, and* (Page 20: "3.2.3 Specifying Operation Sequences"; "...identify the precise operation sequences to be executed for each term ...The iteration is bypassed (for" only), performed once, an intermediary number of times (possibly a statistical median if available), and a maximum M number of times... ". Looking at Figs. 4, 5 and

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"regular expressions" illustration of "3.2.2 Expressing Sequence Diagram as Regular Expressions", the elements are implicitly ordered from largest number of operations (i.e., uncovered subsequences) by a "*" and explicit numbers of iterations.) *selecting a subsequence starting with that element.* (Pages 20 - 21: "3.2.3 Specifying Operation Sequences". The number of iterations of a use case is assigned in the use case sequence.)

Claim 11.

Briand discloses *the method of claim 8 wherein selecting a subsequence based on a selection algorithm comprises:*

- *determining which element starts a largest number of still uncovered subsequences, and (Page 20: "3.2.3 Specifying Operation Sequences"; "...identify the precise operation sequences to be executed for each term ...The iteration is bypassed (for * only), performed once, an intermediary number of times (possibly a statistical median if available), and a maximum M number of times ...". Looking at Figs. 4, 5 and "regular expressions" illustration of "3.2.2 Expressing Sequence Diagram as Regular Expressions", the elements are implicitly ordered from largest number of operations (i.e., uncovered subsequences) by a * and explicit numbers of iterations.)*
- *if there is only one such an element, selecting a subsequence starting with that element, and (Pages 20 - 21: "3.2.3 Specifying Operation Sequences". The number of iterations of a use case is assigned in the use case sequence.)*

- *if there is a tie, employing a tiebreaker.*

(Pages 20 - 21: "3.2.3 Specifying Operation ,Sequences". Use cases with equal number of iterations are chosen and assigned equally in terms of execution priority.)

Claim 12.

Briand discloses *the method of claim 9 wherein generating a suite of test cases from the subsequences comprises:*

- *selecting a subsequence,*

(Page 12: "Generating Use Case Sequences" and associated text; "...principles underlying the representation and generation of possible use case test sequences...".

Appendix H: "...algorithms for the production of complete use case sequences to be tested from the activity diagram describing use case sequential dependencies and test scale information ...".)

- *adding the selected subsequence to a test case,*

(Page 14: "Generation of Use Case Sequences"; "...The combination of instantiated use case sequences...".)

- *marking the selected subsequence as covered,* and (Pages 17 - 18: Generation of "interleaving" sequences. When use case sequences are generated by combining use cases, the combined uses cases. are implicitly kept track as already been covered.)

- *repeating until no subsequence remains uncovered.*

(page 23: "3.3 Generating Variant Sequences". "...one variant corresponds to a possible path realization condition for on of the product terms in the interaction diagram regular

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expressions. A variant may require several test cases ... ". All use cases are covered under generated variant sequences.)

Claim 13: is a computer product claim for performing a method corresponding to the method of claim 1. Therefore, claim 13 is rejected for the same reason set forth in connection to the rejection of claim 1 above.

Claims 14, 15, 16, and 17:

Briand discloses an apparatus (Fig. 2 - system used by the librarian - associated text. Abstract: "...testing an entire system ...In the context of object-oriented, UML development...") for performing a method corresponding to the method of claims 1, 2 and 3, 4 and 5, and 10.

Claims 18 - 23:

Briand discloses an apparatus (Fig. 2 - system used by the librarian - associated text. Abstract: "...testing an entire system ...In the context of object-oriented, UML development...") for performing a method corresponding to the method of claims 1 and 12, 2-5, 11, 7 and 8. And regarding testing until all subsequences with the list have been marked as covered see (Macpherson, 5:45 – 60, which shows repeating test sequences).

Response to Arguments

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4. Applicant's arguments with respect to claims 1 – 23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Correspondence information


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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuck Kendall whose telephone number is 571-272-3698. The examiner can normally be reached on 10:00 am - 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ck.



TUAN DAM
SUPERVISORY PATENT EXAMINER